Yersiniosis

Section 1: ABOUT THE DISEASE

A. Etiologic Agent

Yersiniosis is caused by gram-negative bacteria, *Yersinia enterocolitica* or *Yersinia pseudotuberculosis. Y. pseudotuberculosis* includes 6 serotypes with 4 subtypes; *Y. enterocolitica* has over 50 serotypes and 5 biotypes (strains). Many of these are considered to be non-pathogenic.

B. Clinical Description

The most common symptoms of yersiniosis are fever and diarrhea, which is sometimes bloody. The disease may also present as enterocolitis and acute mesenteric lymphadenitis, mimicking appendicitis. Complications can include systemic infections, post-infectious arthritis, and erythema nodosum. Abdominal pain is usually seen with yersiniosis caused by *Y. pseudotuberculosis*, while enterocolitis is more commonly seen with *Y. enterocolitica*.

C. Vectors and Reservoirs

The reservoir for *Yersinia* is primarily animals: notably, pigs for *Y. enterocolitica,* and avians, rodents, and other small mammals for *Y. pseudotuberculosis*.

D. Modes of Transmission

Yersinia is acquired by ingestion of contaminated food or water, by contact with infected animals, or rarely, through person-to-person transmission. Pathogenic strains of *Y. enterocolitica* have been isolated from raw pork and pork products, such as cold cuts. There has also been nosocomial transmission and transmission via transfusion of blood products from donors with asymptomatic or mild infection.

E. Incubation Period

The incubation period is generally less than 10 days, and averages 3–7 days.

F. Period of Communicability or Infectious Period

The disease is communicable for as long as the infected person excretes *Yersinia* in stool, which is at least as long as symptoms exist (approximately 2–3 weeks); untreated cases may shed for as long as 3 months. Children and adults have been reported with prolonged asymptomatic carriage.

G. Epidemiology

Yersiniosis occurs worldwide, with the highest isolation rates reported during the cold season in temperate climates (including North America). *Y. pseudotuberculosis* is primarily a zoonotic disease with humans as incidental hosts. The most important source of infection with *Y. enterocolitica* may be pork. Approximately two-thirds of the reported *Y. enterocolitica* cases occur in infants and children, while three-fourths of *Y. pseudotuberculosis* cases are reported among 5–20 year olds. Cases of yersiniosis have been associated with disease in household pets.

H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.

Section 2:
REPORTING CRITERIA AND LABORATORY TESTING

A. What to Report to the Massachusetts Department of Public Health (MDPH)

Report any isolation of *Y. enterocolitica* or *Y. pseudotuberculosis* from the patient's blood or feces.

Note: See Section 3C for information on how to report a case.

B. Laboratory Testing Services Available

The MDPH State Laboratory Institute (SLI), Enteric Laboratory will test stool specimens for the presence of *Yersinia* and will also perform confirmatory testing and speciation on isolates from clinical specimens submitted by other laboratories. In addition, the SLI Enteric Laboratory requests submission of all *Yersinia* isolates for further testing for disease surveillance purposes.

For more information, contact the SLI Enteric Laboratory at (617) 983-6609.

The SLI Food Microbiology Laboratory, at (617) 983-6610, will test implicated food items from case clusters or outbreaks for *Yersinia*. See Section 4D for more information.

Section 3:
REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify whether the case may be a source of infection for other persons (e.g., a diapered child, daycare attendee, or food handler), and if so, to prevent further transmission.
- To identify transmission sources of public health concern (e.g., a restaurant or a commercially-distributed food product), and to stop transmission from such sources.

B. Laboratory and Health Care Provider Reporting Requirements

Yersiniosis is reportable to the local board of health (LBOH). The MDPH requests that health care providers immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of yersiniosis, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of *Yersinia* infection shall report such evidence of infection directly to the MDPH within 24 hours.

C. Local Board of Health (LBOH) Reporting and Follow-Up Responsibilities

Reporting Requirements

MDPH regulations *(105 CMR 300.000)* stipulate that yersiniosis is reportable to the LBOH and that each LBOH must report any case of yersiniosis or suspect case of yersiniosis, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS) using an official MDPH *Enteric Disease Case Report Form* (found at the end of this chapter). Refer to the *Local Board of Health Timeline* at the end of this manual's *Introduction* section for information on prioritization and timeliness requirements of reporting and case investigation.

Case Investigation

1. It is the responsibility of the LBOH to complete a MDPH *Enteric Disease Case Report Form* by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the health care provider or from the medical record.
2. Use the following guidelines to assist in completing the form:
   a. Accurately record the demographic information, date of symptom onset, symptoms, and medical information.
   b. When asking about exposure history (e.g., food, travel, activities), use the incubation period range for yersiniosis (3–7 days). Specifically, focus on the period beginning a minimum of three days prior to the case's onset date back to no more than seven days before onset.
   c. If possible, record any restaurants at which the case ate, including food item(s) consumed and date(s) of consumption. If you suspect that the case became infected through food, use the MDPH *Foodborne Illness Complaint Worksheet* (found at the end of this chapter) to facilitate recording additional information. It is requested that the LBOH fax or mail this worksheet to the MDPH Center for Environmental Health, Food Protection Program (FPP); see top of worksheet for fax number and address. This information is entered into a database to help link complaints, thus helping to identify foodborne illness outbreaks. *Note: This worksheet does not replace the MDPH Enteric Disease Case Report Form.*
   d. Ask questions about travel history and outdoor activities to help identify where the case became infected.
   e. Ask questions about water supply (yersiniosis may be acquired through water consumption), and record in the "Comments" section.
   f. Household/close contact, pet or other animal contact, daycare, and food handler questions are designed to examine the case's risk of having acquired the illness from or potential for transmitting it to contacts. Determine whether the case attends or works at a daycare facility and/or is a food handler.
   g. If you have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the case report form with as much information as you have gathered. Please note on the form the reason(s) why it could not be filled out completely.
3. After completing the form, attach laboratory report(s) and fax or mail (in an envelope marked "Confidential") to ISIS. The confidential fax number is (617) 983-6813. Call ISIS at (617) 983-6801 to confirm receipt of your fax. The mailing address is:

MDPH, Office of Integrated Surveillance and Informatics Services (ISIS)
305 South Street, 5th Floor
Jamaica Plain, MA 02130
Fax: (617) 983-6813

4. Institution of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.

Section 4:

CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements *(150 CMR 300.200)*

Food handlers with yersiniosis must be excluded from work.

Note: A case of yersiniosis is defined by the reporting criteria in Section 2A.

Minimum Period of Isolation of Patient

After their diarrhea has resolved, food handlers may return to work only after producing one negative stool specimen. If a case has been treated with an antimicrobial, the stool specimen shall not be collected until at least 48 hours after cessation of therapy. In outbreak circumstances, a second consecutive negative stool specimen is required prior to returning to work.

Minimum Period of Quarantine of Contacts

Contacts with diarrhea who are food handlers shall be considered the same as a case and shall be handled in the same fashion. In outbreak circumstances, asymptomatic contacts who are food handling facility employees shall be required to produce 2 negative stool specimens, 24 hours apart. No restrictions otherwise.

Note: A food handler is any person directly preparing or handling food. This can include a patient care or childcare provider. See the Glossary (at the end of this manual) for a more complete definition.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Daycare

Since yersiniosis may be transmitted from person to person through fecal-oral transmission, it is important to carefully follow up on cases of yersiniosis in a daycare setting. General recommendations include:

- Children with *Yersinia* infection who have diarrhea should be excluded until their diarrhea is resolved.

- Children with *Yersinia* infection who have no diarrhea and are not otherwise ill may be excluded or may remain in the program if special precautions are taken.
- Since most staff in childcare programs are considered food handlers, those with *Yersinia* in their stools (symptomatic or not) can remain on site, but must not prepare food or feed children until their diarrhea is gone and they have 1 negative stool specimen (taken at least 48 hours after completion of antibiotic therapy, if antibiotics are given) (per *105 CMR 300.200*).

School

Since yersiniosis may be transmitted from person to person through fecal-oral transmission, it is important to carefully follow up on cases of yersiniosis in a school setting. Chapter 8 of the MDPH *Comprehensive School Health Manual* provides detailed information on case follow-up and control of diseases spread through the intestinal tract in a school setting. General recommendations include:

- Students or staff with *Yersinia* infection who have diarrhea should be excluded until their diarrhea is resolved.
- Students or staff with *Yersinia* infection who do not handle food, who have no diarrhea or have mild diarrhea, and who are not otherwise sick, may remain in school if special precautions are taken.
- Students or staff who handle food and have *Yersinia* infection (symptomatic or not) must not prepare food until their diarrhea is gone and they have 1 negative stool specimen (taken at least 48 hours after completion of antibiotic therapy, if antibiotics are given) (per *105 CMR 300.200*).

Community Residential Programs

Actions taken in response to a case of yersiniosis in a community residential program will depend on the type of program and the level of functioning of the residents.

In long-term care facilities, residents with yersiniosis should be placed on standard (including enteric) precautions until their symptoms subside and they have one negative stool specimen for *Yersinia*. (Refer to the MDPH Division of Epidemiology and Immunization *Control Guidelines for Long-Term Care Facilities* document for further actions. A copy can be obtained by calling the Division at (617) 983-6800 or (888) 658-2850, or on the MDPH website at www.mass.gov/dph.) Staff members who give direct patient care (e.g., feed patients, give mouth or denture care, or give medications) are considered food handlers and are subject to food handler restrictions under *105 CMR 300.200* (see Section 4A for more information). In addition, staff members with *Yersinia* infection who are not food handlers should not work until their diarrhea is resolved.

In residential facilities for the developmentally disabled, staff and clients with yersiniosis must refrain from handling or preparing food for other residents until their diarrhea has subsided and they have one negative stool specimen for *Yersinia* (collected at least 48 hours after completion of antibiotic therapy, if antibiotics are given) (per *105 CMR 300.200*). In addition, staff members with *Yersinia* infection who are not food handlers should not work until their diarrhea is gone.

Reported Incidence Is Higher Than Usual/Outbreak Suspected

If the number of reported cases of yersiniosis in your city/town is higher than usual or if you suspect an outbreak, investigate to determine the source of infection and the mode of transmission. A common vehicle or venue (such as water, food, or association with a daycare center) should be sought, and applicable preventive or control measures

should be instituted. Control of person-to-person transmission requires special emphasis on personal cleanliness and sanitary disposal of feces. Consult with the epidemiologist on-call at the MDPH Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases across town lines, which would otherwise be difficult to identify at the local level.

Note: Refer to the MDPH Foodborne Illness Investigation and Control Reference Manual for comprehensive information on investigating foodborne illness complaints and outbreaks. Copies of this manual have been made available to LBOH and can also be located on the MDPH website in PDF format at www.mass.gov/dph/fpp/refman.htm. For the most recent changes to the Massachusetts Food Code, contact the FPP at (617) 983-6712 or through the MDPH website at www.mass.gov/dph/fpp.

D. Preventive Measures

Environmental Measures

Implicated food items must be removed from consumption. A decision about testing implicated food items can be made in consultation with the FPP or the MDPH Division of Epidemiology and Immunization. The FPP can help coordinate pick-up and testing of food samples. If a commercial product is suspected, the FPP will coordinate follow-up with relevant outside agencies.

Note: The role of the FPP is to establish policy and to provide technical assistance with the environmental investigation, such as interpreting the Massachusetts Food Code, conducting a Hazard Analysis and Critical Control Point (HACCP) risk assessment, initiating enforcement actions, and collecting food samples.

The general policy of the SLI is to test food samples implicated in suspected outbreaks, not those implicated in single cases (except when botulism is suspected). The LBOH may suggest that the holders of food implicated in single case incidents locate a private laboratory that will test food or store the food in their freezer for a period of time in case additional reports are received. However, a single confirmed case with leftover food consumed within the incubation period may be considered for testing.

Personal Preventive Measures/Education

To avoid exposure, recommend that individuals:

- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.
- Wash the child's hands as well as their own hands after changing a child's diapers, and dispose of the diaper in a sanitary manner.
- When caring for someone with diarrhea, scrub their hands with plenty of soap and water after cleaning the bathroom, after helping the person use the toilet, or after changing diapers, soiled clothes, or soiled sheets.
- Keep food that will be eaten raw, such as vegetables, from becoming contaminated by animal-derived food products.
- Avoid letting infants or young children touch pets (especially puppies and kittens) that are sick or have diarrhea.
- Make sure to cook all food products from animals thoroughly, especially pork products.

Discuss transmission risks that may result from oral-anal sexual contact. Latex barrier protection (e.g., dental dam) may prevent the spread of yersiniosis to a case's sexual partners as well as help prevent exposure to and transmission of other fecal-oral pathogens.

ADDITIONAL INFORMATION

There is no formal Centers for Disease Control and Prevention (CDC) surveillance case definition for yersiniosis. For reporting to the MDPH, always use the criteria outlined in Section 2A of this chapter.

REFERENCES

American Academy of Pediatrics. [*Yersinia enterocolitica* and *Yersinia pseudotuberculosis* Infections.] In: Pickering L.K., ed. *Red Book: 2003 Report of the Committee on Infectious Diseases, 26th Edition.* Elk Grove Village, IL, American Academy of Pediatrics; 2003: 690–692.

Heymann, D., ed. *Control of Communicable Diseases Manual, 18th Edition*. Washington, DC, American Public Health Association, 2004.

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<www.mass.gov/dph/fpp/refman.htm>.

MDPH. *Regulation 105 CMR 300.000: Reportable Diseases, Surveillance, and Isolation and Quarantine Requirements*. MDPH, Promulgated November 4, 2005.

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<www.cdc.gov/ncidod/dbmd/diseaseinfo/yersinia_g.htm>.

FORMS & WORKSHEETS

Yersiniosis

Yersiniosis

LBOH Action Steps

This form does not need to be submitted to the MDPH with the case report form. It is for LBOH use and is meant as a quick-reference guide to yersiniosis case investigation activities.

LBOH staff should follow these steps when yersiniosis is suspected or confirmed in the community. For more detailed information, including disease epidemiology, reporting, case investigation, and follow-up, refer to the preceding chapter.

- ❑ Notify the MDPH Division of Epidemiology and Immunization, at (617) 983-6800 or (888) 658-2850, to report any suspect or confirmed case(s) of yersiniosis.
- ❑ Obtain laboratory confirmation.
- ❑ For yersiniosis suspected to be the result of food consumption, complete a MDPH *Foodborne Illness Complaint Worksheet* and forward to the MDPH Center for Environmental Health, Food Protection Program (FPP).
- ❑ Contact the MDPH Division of Epidemiology and Immunization or the FPP to discuss whether or not to submit suspect foods for testing.
- ❑ Identify other potential exposure sources.
- ❑ Determine whether the case attends or works at a daycare facility and/or is a food handler.
- ❑ Identify other potentially exposed persons.
- ❑ Institute isolation and quarantine requirements *(105 CMR 300.200)*, as they apply to a particular case.
- ❑ Fill out the case report form (attach laboratory results).
- ❑ Send the completed case report form (with laboratory results) to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS).